the notion that the ATM segment is non-label switched. However, Tappan itself contradicts that notion. As stated in Tappan:

> "Each switch associates a local virtual path/virtual channel indicator (VPI/VCI) with a channel or path that runs through it. When an ATM switch receives a cell, it consults the cells' VPI/VCI field to identify by table lookup the interface through which to forward the cell. It also replaces that field's contents with a value indicated by the table as being the next switch's code for that path or channel, and it sends the resultant cell to the next switch. **In other words, the function performed by the VPI/VCI field enables it to serve as the stack's top label. This is why a label-switching router implemented as an ATM switch can ignore the top label field, on which other implementations rely.**" (Col. 4, lines 1-13, emphasis added)

Hence, the described ATM segment is a label-switched segment rather than a non-label switched segment as recited in the claim. For the reasons stated above, claim 1 distinguishes Tappan and withdrawal of the rejection is requested. Further, claims 2-9 which are dependent claims based on claim 1 are allowable for the same reasons and withdrawal of the rejections of those claims is also requested.

Claims 10, 28, 34, 40, 46, 50, 53 and 57 distinguish Tappan for similar reasons. For example, claim 10 recites "encapsulating logic for encapsulating the packet and label stack information to form an encapsulated packet and for establishing a tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain." Since Tappan does not discuss establishing such a tunnel across a non-label switched domain for sending such a packet, Tappan is distinguished from the currently claimed invention. Similarly, claim 28 distinguishes Tappan by reciting "establishing a tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain; receiving a an encapsulated packet from the tunnel, the encapsulated packet including a label stack ... ." Similarly, claim 34 distinguishes Tappan by reciting "receiving logic for

receiving an encapsulated packet from a tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain, the encapsulated packet including a label stack." Similar distinguishing recitations are present in claims 40, 46, 50, 53, and 57. For the reasons stated above, withdrawal of the rejections of claims 11-18 and 28-57 is requested.

Claims 19-27 were rejected under 35 U.S.C. 103(a) over Tappan in view of Casey. The Office again cited Tappan for showing tunneling of a packet with a label across a non-label switched segment. However, as discussed above Tappan itself describes the VPI/VCI field in the ATM segment as a label. Casey shows an MPLS, i.e., label switched, backbone in Fig. 3. In contrast, claim 19 recites "program code for establishing an IP tunnel **across the non-label switched domain** which connects the first label switched domain and the second label switched domain; program code for encapsulating **the packet and label stack** information to form an encapsulated packet." (emphasis added). For the reasons stated above, claim 19 and related dependent claims 20-27 distinguish the cited combination. Withdrawal of the rejections of those claims is requested.

At page 17 of the OA the Office suggests that carriers only desire to provide pipes to carry customer traffic. Actually, carriers may prefer to provide customized services because of higher margins in comparison with basic transport. Carriers do however generally desire to reduce capital expenditures on equipment, particularly in the current telecom market. If a carrier wishes to transmit label-switched traffic across a non-label switching segment without replacing the non-label switching segment, the presently claimed invention provides a technique to help accomplish that goal.

Claims 50-52 were rejected under 35 U.S.C. §101. The claims have been amended in accordance with the comments by the Office. Withdrawal of the rejections is therefore requested.

Applicants have made a diligent effort to place the claims in condition for allowance. However, should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Holmes W. Anderson, Applicants' Attorney at 978-264-6664 (ext. 305) so that such issues may be resolved as expeditiously as possible.

For these reasons, and in view of the above amendments, this application is now considered to be in condition for allowance and such action is earnestly solicited.

Respectfully Submitted,

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CLAIMS

1. (previously amended) A method for establishing a label switched path for forwarding a packet with a label stack in a communication network, the communication network including a first label switched domain and a second label switched domain interconnected by a non-label switched domain, the method comprising:

establishing a tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain;

encapsulating the packet and label stack to form an encapsulated packet; and

forwarding the encapsulated packet through the tunnel,

whereby label stack information is preserved.

2. (original) A method according to claim 1, wherein establishing a tunnel includes mapping a top label of the label stack to the tunnel.

3. (original) A method according to claim 1, wherein the tunnel is an IP tunnel.

4. (original) A method according to claim 3, wherein the IP tunnel is a Generic Routing Encapsulation (GRE) tunnel.

5. (original) A method according to claim 4, wherein encapsulating the packet and label stack information includes providing a label switching protocol identifier such that the second label switched domain may identify the packet and label stack.

6. (original) A method according to claim 1, wherein the first label switched domain is a Multiprotocol Label Switching (MPLS) domain.

7. (original) A method according to claim 1, wherein the second label switched domain is a Multiprotocol Label Switching (MPLS) domain.

8. (original) A method according to claim 1, wherein the first label switched domain is a MPLS domain and the second label switched domain is a MPLS domain.

9. (previously amended) A method according to claim 8, wherein encapsulating the packet and label stack information includes providing an MPLS identifier in the encapsulated packet such that the second label switched domain may identify the packet and label stack.

10. (previously amended) A device for establishing a label switched path for forwarding a packet with a label stack in a communication network, the communication network including a first label switched domain and a second label switched domain interconnected by a non-label switched domain, the device comprising:

label switching forwarding logic for identifying the next hop for the packet;

encapsulating logic for encapsulating the packet and label stack information to form an encapsulated packet and for establishing a tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain; and

forwarding logic for forwarding the encapsulated packet through the tunnel.

11. (original) A device according to claim 10, wherein the label switching forwarding logic includes mapping logic for mapping a top label of the label stack to the tunnel.

12. (original) A device according to claim 10, wherein the tunnel is an IP tunnel.

13. (original) A device according to claim 12, wherein the IP tunnel is a Generic Routing Encapsulation (GRE) tunnel.

14. (previously amended) A device according to claim 13, wherein the encapsulated packet includes a label switching protocol identifier such that the second label switched domain can identify the packet and label stack.

15. (original) A device according to claim 10, wherein the first label switched domain is a Multiprotocol Label Switching (MPLS) domain.

16. (original) A device according to claim 10, wherein the second label switched domain is a Multiprotocol Label Switching (MPLS) domain.

17. (original) A device according to claim 10, wherein the first label switched domain is a MPLS domain and the second label switched domain is a MPLS domain.

18. (previously amended) A device according to claim 17, wherein the encapsulated packet includes an MPLS identifier such that the second label switched domain may identify the packet and label stack.

19. (previously amended) A computer program product for generating a packet for use on a computer system for establishing a label switched path for forwarding a packet with a label stack in a communication network, the communication network including a first label switched domain and a second label switched domain interconnected by a non-label switched domain, the computer program product comprising a computer usable medium having computer readable program code thereon, the computer readable program code including:

program code for establishing an IP tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain;

program code for encapsulating the packet and label stack information to form an encapsulated packet; and

program code for forwarding the encapsulated packet through the tunnel.

20. (original) A computer program product according to claim 19, further including program code for mapping a top label of the label stack to the tunnel.

21. (original) A computer program according to claim 19, wherein the tunnel is an IP tunnel.

22. (original) A computer program product according to claim 21, wherein the IP tunnel is a Generic Routing Encapsulation (GRE) tunnel.

23. (previously amended) A computer program product according to claim 22, further including program code for providing a label switching protocol identifier in the encapsulated packet such that the second label switched domain may identify the packet and label stack.

24. (original) A computer program product according to claim 19, wherein the first label switched domain is a Multiprotocol Label Switching (MPLS) domain.

25. (original) A computer program product according to claim 19, wherein the second label switched domain is a Multiprotocol Label Switching (MPLS) domain.

26. (original) A computer program product according to claim 19, wherein the first label switched domain is a MPLS domain and the second label switched domain is a MPLS domain.

27. (previously amended) A computer program product according to claim 26, further including program code for providing an MPLS identifier in the encapsulated packet such that the second label switched domain may identify the packet and label stack.

28. (previously amended) A method for establishing a label switched path for forwarding a packet with a label stack in a communication network, the communication network including a first label switched domain and a second label switched domain interconnected by a non-label switched domain, the method comprising:

establishing a tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain;

receiving a an encapsulated packet from the tunnel, the encapsulated packet including a label stack;

de-encapsulating the encapsulated packet and label stack; and

forwarding the de-encapsulated packet and label stack across the second label switched domain.

29. (original) A method according to claim 28, wherein the first label switched domain is a MPLS domain and the second label switched domain is a MPLS domain.

30. (original) A method according to claim 28, wherein the tunnel is an IP tunnel.

31. (original) A method according to claim 30, wherein the IP tunnel is a Generic Routing Encapsulation (GRE) tunnel.

32. (previously amended) A method according to claim 28, wherein the ~~tunnel~~ encapsulated packet includes a label switching protocol identifier such that the second label switched domain may identify the packet and label stack.

33. (previously amended) A method according to claim 29, wherein the ~~tunnel~~ encapsulated packet includes a MPLS identifier such that the second label switched domain may identify the packet and label stack.

34. (previously amended) A device for establishing a label switched path for forwarding a packet with a label stack in a communication network, the communication network including a first label switched domain and a second label switched domain interconnected by a non-label switched domain, the device comprising:

receiving logic for receiving an encapsulated packet from a tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain, the encapsulated packet including a label stack;

de-encapsulating logic for de-encapsulating the encapsulated packet and label stack; and

forwarding logic for forwarding the de-encapsulated packet and label stack across the second label switched domain.

35. (original) A device according to claim 34, wherein the tunnel is an IP tunnel.

36. (original) A device according the claim 35, wherein the IP tunnel is a Generic Routing Encapsulation (GRE) tunnel.

37. (original) A device according to claim 34, wherein the first label switched domain is an MPLS domain and the second label switched domain is a MPLS domain.

38. (previously amended) A device according to claim 34, wherein the encapsulated_packet includes a label switching protocol identifier such that the second label switched domain may identify the packet and label stack.

39. (previously amended) A device according to claim 37, wherein the encapsulated packet includes a MPLS identifier such that the second label switched domain may identify the packet and label stack.

40. (previously amended) A computer program product for use on a computer system for establishing a label switched path for forwarding a packet with a label stack in a communication network, the communication network including a first label switched domain and a second label switched domain interconnected by a non-label switched domain, the computer program product comprising a computer useable medium having computer readable program code thereon, the computer readable program code including:

program code for establishing a tunnel across the non-label switched domain which connects the first label switched domain and the second label switched domain;

program code for receiving an encapsulated packet from the tunnel, the encapsulated packet including a label stack;

program code for de-encapsulating the encapsulated packet and the label stack; and

program code for forwarding the de-encapsulated packet and label stack across the second label switched domain.

41. (original) A computer program product according to claim 40, wherein the tunnel is an IP tunnel.

42. (original) A computer program product according to claim 41, wherein the IP tunnel is a Generic Routing Encapsulation (GRE) tunnel.

43. (original) A computer program product according to claim 40, wherein the first label switched domain is a MPLS domain and the second label switched domain is a MPLS domain.

44. (previously amended) A computer program product according to claim 40, wherein ~~tunnel~~ encapsulated packet includes a label switching protocol identifier such that the second label switched domain may identify the packet and label stack.

45. (previously amended) A computer program product according to claim 43, wherein the encapsulated packet includes a MPLS identifier such that the second label switched domain may identify the packet and label stack.

46. (previously amended) A method, executed in a communication system having a first label switched domain interconnected with a second label switched domain by a non-label switched domain, for forwarding a label switched packet from the first label switched domain to the second label switched domain, the method comprising:

establishing a tunnel from an egress device of the first label switched domain to an ingress device of the second label switched domain over the non-label switched domain;

encapsulating the label switched packet by the egress device of the first label switched domain;

forwarding the encapsulated label switched packet by the egress device of the first label switched domain over the tunnel to the ingress device of the second label switched domain;

de-encapsulating the encapsulated label switched packet by the ingress device of the second label switched domain; and

forwarding the de-encapsulated label switched packet by the ingress device of the second label switched domain based upon label switching information in the packet.

47. (original) A communication system according to claim 46, wherein the first label switched domain is a MPLS domain and the second label switched domain is a MPLS domain.

48. (original) A communication system according to claim 46, wherein the tunnel is an IP tunnel.

49. (original) A communication system according to claim 48, wherein the IP tunnel is a Generic Routing Encapsulation (GRE) tunnel.

50. (currently amended) A computer program stored on a computer readable medium for executing a tunneling protocol for interconnecting a first label switched domain and a second label switched domain, comprising:

encapsulation means for encapsulating a payload packet from a label switched protocol; and

a protocol type indicator for identifying the label switched protocol.

51. (currently amended) A computer program stored on a computer readable medium according to claim 50, wherein the label switched protocol is MPLS.

52. (currently amended) A computer program stored on a computer readable medium according to claim 50, wherein the tunneling protocol is a modified Generic routing Encapsulation (GRE) protocol.

53. (previously amended) A communication system comprising a first label switched domain having an egress device, a second label switched domain having an ingress device and a non-label switched domain which couples the egress device of the first label switched domain to the ingress device of the second label switched domain, wherein a label switched path for forwarding a packet and a label stack is established by

establishing a tunnel from an egress device of the first label switched domain to an ingress device of the second label switched domain over the non-label switched domain;

encapsulating the packet and label stack by the egress device of the first label switched domain;

forwarding the encapsulated packet and label stack by the egress device of the first label switched domain over the tunnel to the ingress device of the second label switched domain;

de-encapsulating the encapsulated packet and label stack by the ingress device of the second label switched domain; and

forwarding the de-encapsulated packet and label stack by the ingress device of the second label switched domain based upon label switching information in the packet.

54. (original) A communication system according to claim 53, the first label switched domain is a MPLS domain and the second label switched domain is a MPLS domain.

55. (original) A communication system according to claim 53, wherein the tunnel is an IP tunnel.

56. (original) A communication system according to claim 55, wherein the IP tunnel is a Generic Routing Encapsulation (GRE) tunnel.

57. (previously amended) A communication system comprising:

a first label switched domain for forwarding a label switched packet, the first label switched domain having a plurality of label switching devices including an egress device;

a second label switched domain for forwarding the label switched packet, the second label switched domain having a plurality of label switching devices including an ingress device; and

a non-label switched domain having a plurality of forwarding devices, the non-label switched domain coupled the egress device of the first label switched domain to the ingress device of the second label switched domain; wherein:

the egress device establishes a tunnel from the first label switched domain to the ingress device of the second label switched domain across the non-label switched domain;

the egress device encapsulates the label switched packet;

the egress device forwards the encapsulated label switched packet over the tunnel to the ingress device of the second label switched domain;

the ingress device receives the encapsulated label switched packet from the tunnel;

the ingress device de-encapsulates the encapsulated label switched packet; and

the ingress device forwards the de-encapsulated label switched packet based on label switching information in the packet.